BANIDA-WINDER WATER AND SEWER DISTRICT (PWS 6210001) SOURCE WATER ASSESSMENT FINAL REPORT

January 9, 2003

State of Idaho
Department of Environmental Quality

Disclaimer: This publication has been developed as part of an informational service for the source water assessments of public water systems in Idaho and is based on data available at the time and the professional judgement of the staff. Although reasonable efforts have been made to present accurate information, no guarantees, including expressed or implied warranties of any kind, are made with respect to this publication by the State of Idaho or any of its agencies, employees, or agents, who also assume no legal responsibility for the accuracy of presentations, comments, or other information in this publication. The assessment is subject to modification if new data is produced.

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the springs and aquifer characteristics.

This report, *Source Water Assessment for Banida-Winder Water and Sewer District in Franklin County, Idaho*, describes the public water system (PWS), the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The Banida-Winder Water and Sewer District (PWS # 6210001) drinking water system consists of two communities (Banida and Winder) that are recognized as one PWS. The system consists of two springs (Banida Spring and the Winder Spring). The Banida Spring serves the community of Banida and the Winder Spring serves the community of Winder. The springs are located northeast of the city of Banida in the breaks of Poverty Flats. The springs are the systems' sole source of drinking water. The system serves approximately 70 persons in the community of Banida and 125 persons in the community of Winder.

Final susceptibility scores are derived from equally weighted system construction scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in another category results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with mostly urban and heavy agricultural areas, the best score a water source can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, i.e., nitrates), volatile organic contaminants (VOCs, i.e., petroleum products), synthetic organic contaminants (SOCs, i.e., pesticides), and microbial contaminants (i.e., bacteria). As different water sources can be subject to various contamination settings, separate scores are given for each type of contaminant.

The potential contaminant sources within the delineated capture zones for the springs include Fox Creek for Banida Spring and the Treasureton Canal for Winder Spring. In addition, both springs have a road within their delineation. If an accidental spill occurred from any of these corridors, IOCs, VOCs, SOCs, or microbial contaminants could be added to the aquifer systems. A complete list of potential contaminant sources is provided with this assessment (Table 1 and Table 2).

For the assessment, a review of laboratory tests was conducted using the State Drinking Water Information System (SDWIS). No SOCs have been detected in either spring's water. The VOC chloroform, a disinfection byproduct related to chlorine, was detected in August 1994 at the Winder Spring, but has not been detected since. The IOCs barium, cadmium, calcium, chromium, fluoride, mercury, and selenium have been detected in at least one of the springs, but at concentrations below the maximum contaminant level (MCL) for each chemical.

The capture zones for both springs intersect a priority area for the IOC nitrate. The nitrate priority is where greater than 25% of wells/springs show nitrate values above 5 milligrams per liter (mg/L). For the Banida Spring, nitrate concentrations have ranged from 3.2 mg/L to 8.85 mg/L, and Winder Spring nitrate concentrations have ranged between 6.5 mg/L and 7.94 mg/L.

In terms of total susceptibility, Banida Spring rated moderate for IOCs, VOCs, and SOCs, and microbial contamination. System construction rated moderate and potential contaminant/land use scores were moderate for IOCs, VOCs, SOCs, and low for microbials.

In terms of total susceptibility, Winder Spring rated high for IOCs, and moderate for VOCs, SOCs, and for microbial contamination. System construction rated high and potential contaminant/land use scores were moderate for IOCs, VOCs, SOCs, and low for microbials.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the Banida-Winder Water and Sewer District, drinking water protection activities should focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). There should be no application or storage of herbicides, pesticides, or other chemicals within 100 feet of the springs. An additional protective measure would be to limit the use of roads that pass within 100 feet of the spring sources. The system should continue their efforts to keep the distribution system free of microbial contamination. Any new sources that could be considered potential contaminants that reside within a water source's zones of contribution should be investigated and monitored to evaluate the threat the contaminant may pose in the future. Land uses within most of the source water assessment area are outside the direct jurisdiction of the Banida-Winder Water and Sewer District. Therefore, partnerships with federal, state and local agencies, and industrial and commercial groups should be established to ensure future land uses are protective of ground water quality. Educating city employees and the public about source water will further assist the system in its monitoring and protection efforts.

If microbial contamination becomes a problem, appropriate disinfection practices would need to be maintained in a way to protect the drinking water from VOC by-products, a result of the chlorination disinfection. The disinfection product detected in the water was chloroform.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture and the Caribou County Soil and Water Conservation District.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR BANIDA-WINDER WATER AND SEWER DISTRICT, BANIDA, IDAHO

Section 1. Introduction - Basis for Assessment

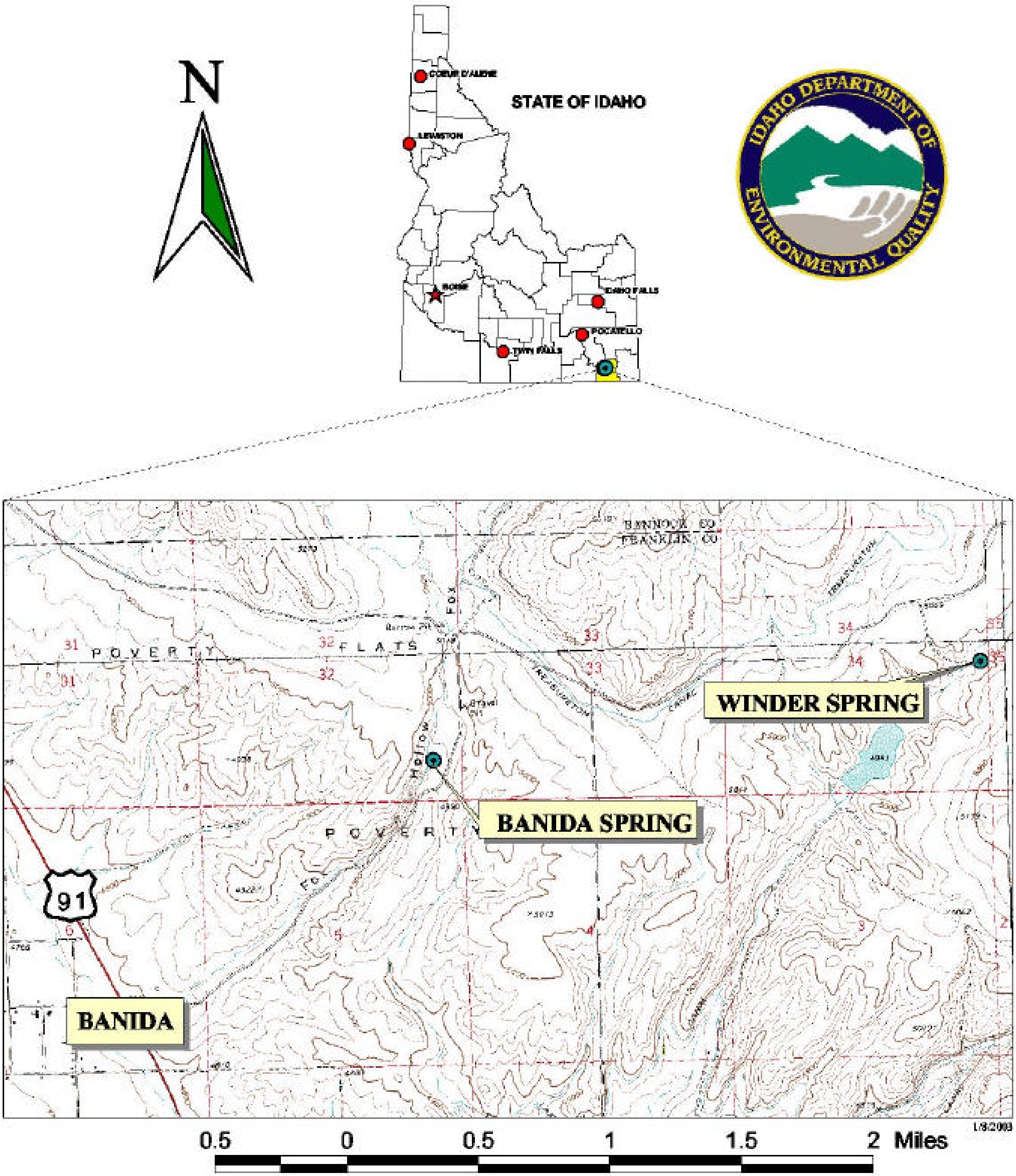
The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is included.

Level of Accuracy and Purpose of the Assessment

The DEQ is required by the EPA to assess over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water supply system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the public water system (PWS).**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Figure 1 - Geographic Location of Banida-Winder Water and Sewer District



Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Banida-Winder Water and Sewer District (PWS # 6210001) drinking water system consists of two communities (Banida and Winder) that are recognized as one PWS. The system consists of two springs (Banida Spring and the Winder Spring). The Banida Spring serves the community of Banida and the Winder Spring serves the community of Winder. The springs are located northeast of the city of Banida in the breaks of Poverty Flats (Figure 1). The springs are the systems' sole source of drinking water. The system serves approximately 70 persons in the community of Banida and 125 persons in the community of Winder.

The potential contaminant sources within the delineated capture zones for the springs include Fox Creek for Banida Spring and the Treasureton Canal for Winder Spring. In addition, both springs have a road within their delineation. If an accidental spill occurred from any of these corridors, inorganic chemicals (IOCs), volatile organic chemicals (VOCs), synthetic organic chemicals (SOCs), or microbial contaminants could be added to the aquifer systems. A complete list of potential contaminant sources is provided with this assessment (Table 1 and Table 2).

No SOCs have been detected in either spring's water. The VOC chloroform, a disinfection byproduct related to chlorine, was detected in August 1994 at the Winder Spring, but has not been detected since. The IOCs barium, cadmium, calcium, chromium, fluoride, mercury, and selenium have been detected in at least one of the springs, but at concentrations below the maximum contaminant level (MCL) for each chemical.

The capture zones for both springs intersect a priority area for the IOC nitrate. The nitrate priority is where greater than 25% of wells/springs show nitrate values above 5 mg/L. For the Banida Spring, nitrate concentrations have ranged from 3.2 mg/L to 8.85 mg/L, and Winder Spring nitrate concentrations have ranged between 6.5 mg/L and 7.94 mg/L.

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-. travel (TOT) zones (zones indicating the number of years necessary for a particle of water to be released from a spring) for water in the aquifer. Washington Group International, Inc (WGI) was contracted by DEQ to define the public water system's zones of contribution. WGI used a conceptual computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the "None" hydrologic province in the vicinity of the Banida-Winder Water and Sewer District. The computer model used site specific data, assimilated by WGI from a variety of sources including operator records, well logs (when available) and hydrogeologic reports. A summary of the hydrogeologic information from the WGI is provided below.

Hydrogeologic Conceptual Model

Graham and Campbell (1981) identified and described 70 regional ground water systems throughout Idaho. Thirty-four of these fall within the southeastern part of the state. The "None" hydrologic province, as defined in this report, includes all the area outside of the 34 regional systems in southeast Idaho. The smaller and more localized aquifers in the "None" province typically are situated in the foothills and mountains that surround and recharge the regional ground water systems.

The mountains and valleys within the "None" hydrologic province were formed during two events separated by approximately 50 to 70 million years (Alt and Hyndman, 1989, pp. 329 and 336). The overthrust belt of the northern Rocky Mountains was formed roughly 70 to 90 million years ago through the intrusion of granitic magma and a massive eastward movement of large slabs of layered sedimentary rocks along faults that dip shallowly westward (Alt and Hyndman, 1989, p. 329). This movement caused extreme folding and fracturing of the sedimentary and granitic rocks and, in many cases, left older formations lying on top of younger ones. Later Basin and Range block faulting broke up the largely eroded Rocky Mountains into large uplifted and downthrown blocks resulting in the present day northwest trending mountains and valleys seen throughout southeast Idaho. Paleozoic and Precambrian limestone, dolomite, sandstone, shale, siltstone, and quartzite are the predominant materials forming the mountains and probable compose the bedrock underlying the valleys between Salmon, Idaho on the north side of the Snake River Plane and Franklin, Idaho near the Utah/Idaho border (Dion, 1969, p.18; Kariya et al., 1994, p. 6; Bjorklund and McGreevy, 1971, p. 12; and Parliman, 1982, p. 9).

Ground water movement in the mountains is primarily through a system of solution channels, fractures and joints that commonly transmit water independently of surface topography (Bjorklund and McGreevy, 1971, p. 15; Dion, 1969, p. 18). Ralston and others (1979, pp. 128-129) state that the geologic structural features also can contribute to the development of cross-basin ground water flow systems. Ground water entering a geologic formation tends to follow the formation because hydraulic conductivities are greater parallel to the bedding planes than across them. Synclines and anticlines provide structural avenues for ground water flow under ridges from one valley to another.

The average annual precipitation in the mountains of southeast Idaho ranges from 20 inches on ridges near Soda Springs to over 45 inches on the Bear River Range (Ralston and Trihey, 1975, p. 7, and Dion, 1969, p. 11). The valleys receive an average of 7 to 10 inches annually (Donato, 1998, p. 3, and Dion, 1969, p. 11). Precipitation and seepage from streams are the primary source of recharge to the mountain aquifers (Kariya, et al., 1994, p. 18, and Parliman, 1982, p. 13).

Ground water discharge occurs as springs and seeps issuing from faults, fractures, and solution channels and as underflow to regional aquifers. The Bear River Basin in the far southeast corner of the state contains hundreds of springs issuing primarily from fractures and solution openings in the bedrock mountains (Dion, 1969, p. 47, and Bjorklund and McGreevy, 1971, pp. 34-35). Within Cache Valley many springs discharge from the valley-fill deposits (Kariya et al., 1994, p. 32).

There is little available information on the distribution of hydraulic head and the hydraulic properties of the aquifers in the "None" hydrologic province. No U.S. Geological Survey (USGS) (2001) or Idaho Statewide Monitoring Network (Neely, 2001) wells are located in the areas of concern to provide information on ground water flow direction and hydraulic gradient or to aid in model calibration. The information that is available indicates that the hydraulic properties are quite variable, even within a specific rock type. Ralston and others (1979, p. 31), for example, present hydraulic conductivity estimates for fractured chert ranging from 2.2 to 75 feet per day (ft/day). Estimates for phosphatic shale are as low as 0.07 ft/day (unfractured) and as high as 25 ft/day (fractured).

Springs and Spring Delineation Methods

A spring is defined as a concentrated discharge of ground water appearing at the ground surface as flowing water (Todd, 1980). The discharge of a spring depends on the hydraulic conductivity of the aquifer, the area of contributing recharge to the aquifer, and the rate of aquifer recharge. PWS springs are generally perennial. Large seasonal changes in the discharge rates are an indication of a relatively shallow flow system. While most springs fluctuate in their rate of discharge, springs in volcanic rock (e.g., basalt) are noted for their nearly constant discharge (Todd, 1980).

Delineation of the wellhead protection area for a spring involves special consideration. Hydrogeologic setting is foremost among the factors that control the shape and extent of the capture zone. The capture zone for a spring resulting from the presence of a high-permeability fracture extending to great depth will be much different from the capture zone resulting from a depression spring formed where the ground surface intersects the water table in a unconsolidated aquifer.

Capture Zone Modeling Method - Refined Method: Uniform Flow Option

The refined method (using the uniform flow option in WhAEM) was used for springs that generally lacked hydrologic data but had a reasonable basis for predicting ground water flow direction and were located outside previously simulated flow domains. The uniform flow option of WhAEM (Kraemer et al., 2000) was used to delineate the source areas for the Banida-Winder springs.

For the uniform flow models it is assumed that the PWS springs issue from sedimentary rock, due to the prevalence of this material throughout the mountains of southern Idaho. For this reason, the hydraulic conductivity, effective porosity, and hydraulic gradient used in the models are the default values presented in Table F-3 of the Idaho Wellhead Protection Plan for mixed volcanic and sedimentary rocks, primarily sedimentary rocks (IDEQ, 1997, p. F-6). The average discharge rates reported by the owner/operator or the State of Idaho Public Water Supply Inventory Form were used for the Banida Water System springs. A base elevation of 0 ft-msl was used to simplify the modeling process and no impact of the size or shape of the resulting source areas. To maintain conservatism, no areal recharge was applied in any of the uniform flow simulations.

The delineated source water assessment area for the Banida Spring can best be described as a an oval approximately 1250 feet wide and 1000 feet long with the longer axis positioned in the northwest-southeasterly direction (Figure 2). Winder Spring's delineation is the area of the drainage basin within approximately two miles up gradient of the spring (Figure 3). The actual data used by to determine the source water assessment delineation areas is available from DEQ upon request.

FIGURE 2. Banida-Winder Water & Sewer District Delineation Map and Potential Contaminant Source Locations

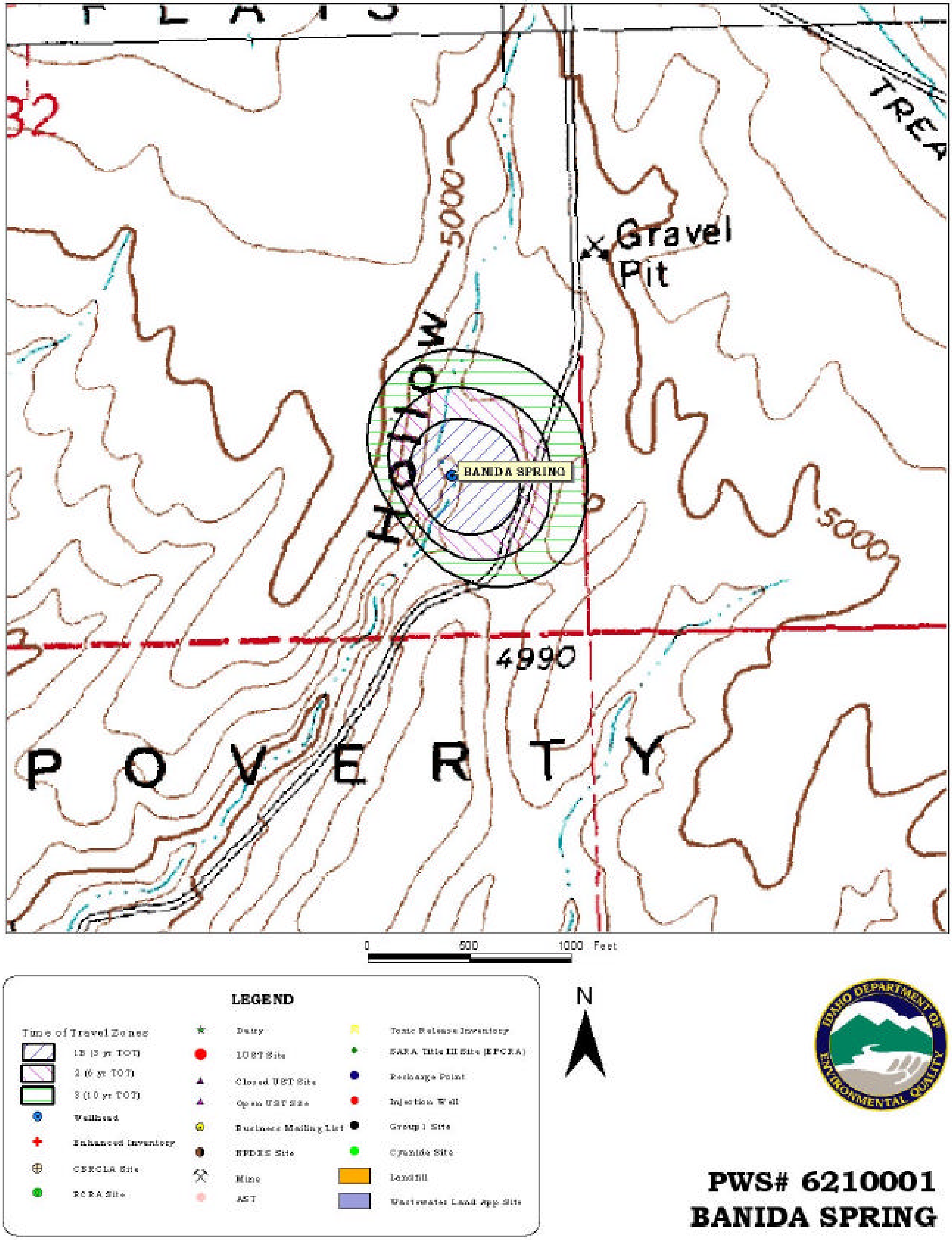
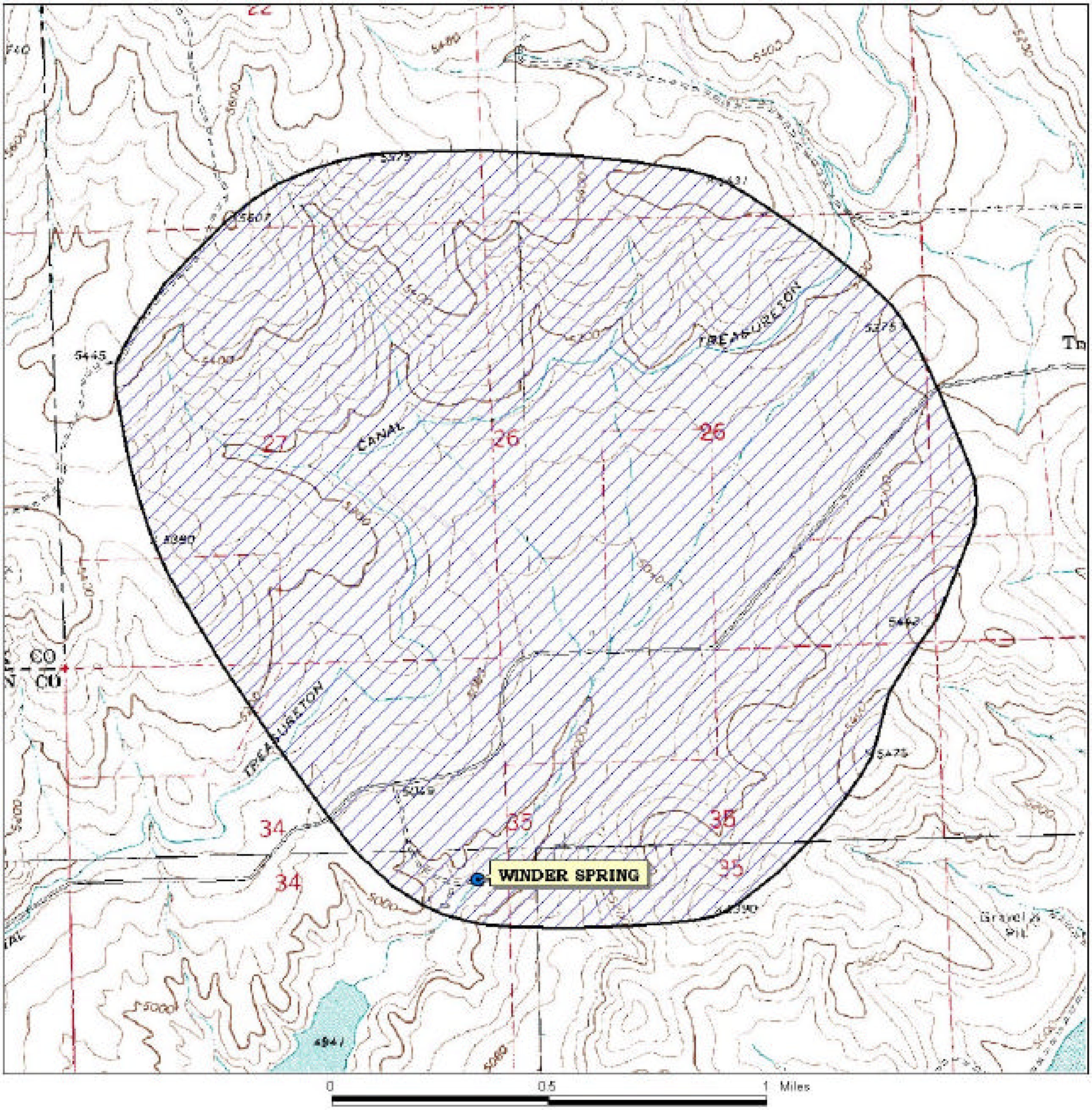


FIGURE 3. Banida-Winder Water & Sewer District Delineation Map and Potential Contaminant Source Locations



PWS# 6210001
WINDER SPRING

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ and reviews of available databases identified potential contaminant sources within the delineation areas.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply source.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted during August of 2002. The first phase involved identifying and documenting potential contaminant sources within the Banida-Winder Water and Sewer District source water assessment areas through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. When the enhanced inventory was conducted, there was no response from the operator, and no additional potential contaminant sources were incorporated into the assessment. However, when DEQ contacted the operator on November 17, 2002 regarding comments to the draft source water assessment report, the operator reported the springs were incorrectly located. . A map with the correct spring locations, delineated areas, and potential contaminant sources are provided with this report (Figure 2 and Figure 3).

Table 1. Banida Spring, Potential Contaminant Inventory

Site #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
	Fox Creek	0-3	GIS Map	IOC, VOC, SOC, Microbials
	Fox Creek	3-6; 610	GIS Map	IOC, VOC, SOC
	Road	3-6; 6-10	GIS Map	IOC, VOC, SOC

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 2. Winder Spring, Potential Contaminant Inventory

Site #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
	Treasureton Canal	0-3	GIS Map	IOC, VOC, SOC, Microbials
	Road	0-3	GIS Map	IOC, VOC, SOC, Microbials

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analyses

The susceptibility of a spring is ranked as high, moderate, or low by evaluating spring construction, whether the infiltration gallery is under the direct influence of surface water, the type of land use, including farm chemical usage and agricultural land percentages, and to incorporate all potentially significant contaminant sources within the delineated area. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Spring Construction

Spring construction scores are determined by evaluating whether the spring has been constructed according to Idaho Code (IDAPA 58.01.08.04) and if the spring's water is exposed to any potential contaminants from the time it exits the bedrock to when it enters the distribution system. If the spring's intake structure, infiltration gallery, and housing are located and constructed in such a manner as to be permanent and protect it from all potential contaminants, is contained within a fenced area of at least 100 feet in diameter, and is protected from all surface water by diversions, berms, etc., then Idaho Code is being met and the score will be lower. If the spring's water comes in contact with the open atmosphere before it enters the distribution system, it receives a higher score. Likewise, if the spring's water is piped directly from the bedrock to the distribution system or is collected in a protected spring box without any contact to potential surface-related contaminants, the score is lower.

Banida Spring rated moderate for system construction. The spring was redeveloped in 1982. Spring water is currently collected by 240 feet of perforated 6-inch PVC pipe that is bedded in gravel and covered with 18 feet of clay soil. The spring's water enters the distribution system without any influence from atmospheric potential contaminants. The sanitary survey noted that the spring needed to be fenced, which increased the score from low to moderate.

Winder Spring rated high for system construction because no information was available about its construction. During calculation of the rating, any unknown information receives a higher, more conservative score. When a sanitary survey is conducted for this spring, the construction score may become lower.

Potential Contaminant Source and Land Use

Banida Spring and Winder Spring both rated moderate for IOCs (i.e., nitrates), VOCs (i.e., petroleum products), SOCs (i.e., pesticides), and low for microbial contaminants (i.e., bacteria).

The potential contaminant sources within the delineated capture zones for the springs include Fox Creek for Banida Spring and the Treasureton Canal for Winder Spring. In addition, both springs have a road within their delineation. If an accidental spill occurred from any of these corridors, IOCs, VOCs, SOCs, or microbial contaminants could be added to the aquifer systems. A complete list of potential contaminant sources is provided with this assessment (Table 1 and Table 2).

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a repeated detection of microbial contamination at the spring will automatically give a high susceptibility rating despite the land use of the area because a pathway for contamination already exists. Additionally, potential contaminant sources within 100 feet of a spring will automatically lead to a high susceptibility rating. System construction scores are heavily weighted in the final scores and having multiple potential contaminant sources in the 0- to 3-year time of travel zone (Zone 1B) contribute greatly to the overall ranking.

Table 3. Summary of Banida-Winder Water and Sewer District Spring Susceptibility Evaluation

Drinking Water Source	Susceptibility Scores[1]								
	Potential Contaminant Inventory and Land Use				System Construction	Final Susceptibility Ranking			
	IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Banida Spring	M	M	M	L	M	M	M	M	M
Winder Spring	M	M	M	L	H	H	M	M	M

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

No SOCs have been detected in either spring's water. The VOC chloroform, a disinfection byproduct related to chlorine, was detected in August 1994 at the Winder Spring, but has not been detected since. The IOCs barium, cadmium, calcium, chromium, fluoride, mercury, and selenium have been detected in at least one of the springs, but at concentrations below the MCL for each chemical.

In terms of total susceptibility, Banida Spring rated moderate for IOCs, VOCs, SOCs, and microbial contamination. System construction rated moderate and potential contaminant/land use scores were moderate for IOCs, VOCs, SOCs, and low for microbials.

In terms of total susceptibility, Winder Spring rated high for IOCs and moderate for VOCs, SOCs, and microbial contamination. The Winder Spring rated high for IOCs due to the combination of a high system construction score and multiplier used in determining the final susceptibility rating for the chemical contaminants. System construction rated high and potential contaminant/land use scores were moderate for IOCs, VOCs, SOCs, and low for microbials.

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed source water protection program will incorporate many strategies. For the Banida-Winder Water and Sewer District, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. No potential contaminants (pesticides, paint, fuel, cleaning supplies, etc.) should be stored or applied within 100 feet of the springs. Land uses within most of the source water assessment areas are outside the direct jurisdiction of the Banida-Winder Water and Sewer District, so collaboration and partnerships with federal, state and local agencies, industrial and commercial groups should be established to ensure future land uses are protective of ground water quality.

If microbial contamination become a problem, appropriate disinfection practices would need to be maintained in a way to protect the drinking water from VOC by-products, a result of the chlorination disinfection. The disinfection product detected in the water was chloroform.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation contains some urban and residential land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the U.S. EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture and the Caribou Soil Conservation and Water District.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Pocatello Regional DEQ Office	(208) 236-6160
State DEQ Office	(208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper, Idaho Rural Water Association, at 208-343-7001 (mlharper@idahoruralwater.com) for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLA – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

References Cited

Alt, D. D., and D.W. Hyndman, 1989, Roadside Geology of Idaho, Mountain Press Publishing Company, Missoula, Montana, 394 p.

Bjorklund, L.J., and L.J. McGreevy, 1971, Ground-Water Resources of Cache Valley, Utah and Idaho, State of Utah Department of Natural Resources, Technical Publication No. 36. 72 p.

Dion, N.P., 1969, Hydrologic Reconnaissance of the Bear River in Southeastern Idaho, U.S. Geological Survey and Idaho Department of Reclamation, Water Information Bulletin No. 13, 66 p.

Donato, M.M, 1998, Surface-Water/Ground-Water Relations in the Lemhi River Basin, East- Central Idaho, U.S. Geological Survey, Water-Resources Investigations Report 98-4185, 28 p.

Graham, W.G., and L.J. Campbell, 1981, Groundwater Resources of Idaho, Idaho Department of Water Resources, 100 p.

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environment Managers, 1997. "Recommended Standards for Water Works."

Idaho Division of Environmental Quality, 1997, Idaho Wellhead Protection Plan, Idaho Wellhead Protection Work Group, February.

Idaho Division of Environmental Quality Ground Water Program, October 1999. Idaho Source Water Assessment Plan.

Idaho Department of Environmental Quality. 2000. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Environmental Quality. 2000. Sanitary Survey of Banida Water System: PWS #6210001.

Kariya, K.A., D.M. Roark, and K.M. Hanson, 1994, Hydrology of Cache County, Utah, and Adjacent Parts of Idaho, with Emphasis on Simulation of Ground-Water Flow, State of Utah Department of Natural Resources Division of Water Resources Division of Water Rights, 120 p.

Kraemer, S.R., H.M. Haitjema, and V.A. Kelson, 2000, Working with WhAEM2000 Source Water Assessment for a Glacial Outwash Well Field, Vincennes, Indiana, U.S. Environmental Protection Agency, Office of Research, EPA/600/R-00/022, 50 p.

Neely, K.W., 2001, Statewide Monitoring Network, Microsoft Access, Idaho Department of Water Resources.

Parliman, D.J., 1982, Ground-Water Quality in East-Central Idaho Valleys, U.S. Geological Survey, Open File Report 81-1011, 55 p.

Ralston, D.R., and E.W. Trihey, 1975, Distribution of Precipitation in Little Long Valley and Dry Valley Caribou County, Idaho, Idaho Bureau of Mines and Geology, Moscow, Idaho, 13 p.

Ralston, D.R., T.D. Brooks, M.R. Cannon, T.F. Corbet, Jr, H. Singh, G.V. Winter and C.M. Wai, 1979, Interaction of Mining and Water Resource Systems in the Idaho Phosphate Field, Research Technical Completion Report, Idaho Resources Research Institute, University of Idaho, 214 p.

Safe Drinking Water Information System (SDWIS). Idaho Department of Environmental Quality.

Todd, D.K., 1980, Groundwater Hydrology, Second Edition, John Wiley & Sons, New York, 535 p.

Washington Group International, Inc, January 2002. Source Area Delineation Report for the "None" Hydrologic Province and Southeast Idaho Springs.

Attachment A

Banida-Winder Water and Sewer District
Susceptibility Analysis Worksheets

Susceptibility Analysis Formulas

Formula for Spring Sources
The final spring scores for the susceptibility analysis were determined using the following formulas:

Banida Spring:

1) VOC/SOC/IOC Final Score = (Potential Contaminant/Land Use X 0.6) + System Construction

2) Microbial Final Score = (Potential Contaminant/Land Use X 1.125) + System Construction

Winder Spring:

1) VOC/SOC/IOC Final Score = (Potential Contaminant/Land Use X 0.818) + System Construction

2) Microbial Final Score = (Potential Contaminant/Land Use X 1.125) + System Construction

Final Susceptibility Scoring:
0 - 7 Low Susceptibility
8 - 15 Moderate Susceptibility
≥ 16 High Susceptibility

Spring Water Susceptibility Report | Public Water System Name: BANIDA WATER SYSTEM | BANIDA SPRING
Public Water System Number 6210001 | 09/26/2002 3:39:30 PM

1. System Construction

		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source Yes = spring developed to collect water from beneath the ground; lower score No = water collected after it contacts the atmosphere or unknown; higher score	YES	0
Total System Construction Score		1

2. Potential Contaminant Source / Land Use

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	1	1	1	1
(Score = # Sources X 2) 8 Points Maximum		2	2	2	2
Sources of Class II or III leacheable contaminants or	YES	5	1	1	
4 Points Maximum		4	1	1	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	0	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		12	7	7	6
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0
Cumulative Potential Contaminant / Land Use Score		18	14	14	9

	IOC	VOC	SOC	Microbial
4. Final Susceptibility Source Score	12	9	9	10
5. Final Well Ranking	Moderate	Moderate	Moderate	Moderate

Spring Water Susceptibility Report | Public Water System Name: BANIDA WATER SYSTEM | WINDER SPRING
Public Water System Number 6210001 | 09/26/2002 3:40:13 PM

1. System Construction

		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source Yes = spring developed to collect water from beneath the ground; lower score No = water collected after it contacts the atmosphere or unknown; higher score	NO	2
Total System Construction Score		3

2. Potential Contaminant Source / Land Use

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	2	2	2	2
(Score = # Sources X 2) 8 Points Maximum		4	4	4	4
Sources of Class II or III leacheable contaminants or	YES	6	1	1	
4 Points Maximum		4	1	1	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	0	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	9	9	8
Cumulative Potential Contaminant / Land Use Score		16	11	11	10
4. Final Susceptibility Source Score		16	12	12	14
5. Final Well Ranking		High	Moderate	Moderate	Moderate